

Appl. No. 10/642,333
Amdt. dated August 30, 2005
Reply to Office Action of June 24, 2005

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A method of continuously capturing BioOil and its constituents from a gas stream produced in a fast pyrolysis/thermolysis process, in a usable liquid form so as to produce a non-condensable gas free of fouling contaminants, comprising:

- (a) separating BioOil and its constituents from a gas stream using hot inertial separation to maintain the BioOil and its sticky and/or thick constituents at a temperature below its point of rapid degradation and above a point at which its viscosity is low enough to avoid inefficient operation of the separation equipment;
- (b) ~~reducing gas velocity providing a settling section to a temperature sufficiently low following said hot inertial separation step in which to allow~~
a gas temperature is low enough to cause droplets in the gas stream to settle out but with a gas temperature high enough so that a viscosity of said droplets remains low enough to avoid inefficient operation of the separation equipment; and
- (c) condensing vapour in the gas stream..

Appl. No. 10/642,333
Amdt. dated August 30, 2005
Reply to Office Action of June 24, 2005

Claim 2 (original): The method of claim 1, including collecting liquid from the gas stream produced by the pyrolysis/thermolysis process.

Claim 3 (original): The method of claim 2, wherein the step of separating BioOil includes providing a first cyclone separator to collect liquid in a range of 5 microns and greater.

Claim 4 (original): The method of claim 3, wherein the step of separating BioOil includes providing a meandering pipe following said first cyclone separator to collect liquid having a sub-micron particle range and greater.

Claim 5 (currently amended): The method of claim 3, including providing a BioOil, wax and char collection tank coupled to a discharge outlet of said first cyclone separator, operating in a temperature low enough to condense condensables remaining free flowing liquids but above about a freezing point of said liquids condensables to increase retention time of the gas stream ~~and slow down a rate of gas volume flow.~~

Claim 6 (canceled)

Claim 7 (original): The method of claim 1, wherein said settling section includes a gas tank.

Appln. No. 10/642,333
Amdt. dated August 30, 2005
Reply to Office Action of June 24, 2005

Claim 8 (original): The method of claim 1, wherein said condensing step takes place in a condensing section whose temperature is in a range of 5 to 20 degrees C.

Claim 9 (original): The method of claim 8, wherein said condensation section includes a gas cooler.

Claim 10 (currently amended): The method of claim 9, including providing a second cyclone separator coupled to an outlet of said gas cooler operative to collect condensate that has been re-entrained in the gas stream in said gas cooler.

Claim 11 (original): The method of claim 10 including providing a condensate collection tank coupled to an outlet of said second cyclone separator.

Claim 12 (original): The method of claim 11, including return lines coupled to outlets of said first cyclone collection tank, said gas tank and said condensate collection tank operative to return collected liquid to the gas stream prior to the separation step.

Claim 13 (currently amended): Apparatus for continuously capturing BioOil and its constituents from a gas stream produced in a fast pyrolysis/thermolysis process, in a usable liquid form so as to produce a non-condensable gas free of fouling contaminants, comprising:

Appln. No. 10/642,333
Amdt. dated August 30, 2005
Reply to Office Action of June 24, 2005

- (a) a separator operative to separate BioOil and its constituents from a gas stream and to maintain the temperature of said BioOil and its constituents such that its sticky and/or thick constituents are below a point of rapid degradation but above a point at which their viscosity is low enough to avoid inefficient operation of the separation equipment;
- (b) a gas retention apparatus having a gas flow path operative to cause ~~reduce gas velocity with a temperature sufficiently low to allow~~ droplets in the gas stream to settle out but with the gas at a temperature high enough so that a viscosity of said droplets remains low enough to avoid inefficient operation of the separation equipment; and
- (c) a condensing section coupled to an outlet of the gas retention apparatus operative to cool the gas to a temperature low enough to condense vapours into a free flowing liquid but above a freezing point of said liquids.

Claim 14 (original): The apparatus of claim 13, wherein said separator is an inertial separator to collect liquid in a range of 5 microns and greater.

Appl. No. 10/642,333
Amdt. dated August 30, 2005
Reply to Office Action of June 24, 2005

Claim 15 (original): The apparatus of claim 14, wherein said inertial separator includes a first cyclone separator.

Claim 16 (original): The apparatus of claim 13, including a product tank for storing liquid from said pyrolysis/thermolysis process and having an outlet coupled to an inlet of said first cyclone separator.

Claim 17 (original): The apparatus of claim 13, wherein said separator further includes a meandering pipe coupled to an outlet of said inertial separator operative to collect BioOil droplets, wax, resin, char and aerosol in a sub-micron size and greater.

Claim 18 (original): The apparatus of claim 15, including a first cyclone collection tank coupled to a discharge outlet of said first cyclone separator, said first cyclone collection tank operative to collect BioOil, wax and char.

Claims 19-20 (canceled)

Claim 21 (currently amended): The apparatus of claim 13 ~~20~~, including a second cyclone separator coupled to an outlet of said gas cooler operative to separate out liquid that has been re-entrained in the gas stream.

Appl. No. 10/642,333
Amdt. dated August 30, 2005
Reply to Office Action of June 24, 2005

Claim 22 (original): The apparatus of claim 21, including a condensate collection tank coupled to an outlet of said second cyclone separator.

Claim 23 (original): The apparatus of claim 22, including return lines coupled to outlets of said first cyclone collection tank, said gas tank and said condensate collection tank, operative to return collected liquid to said product tank.